

ELECTRICITY AND ELECTRIC CIRCUITS

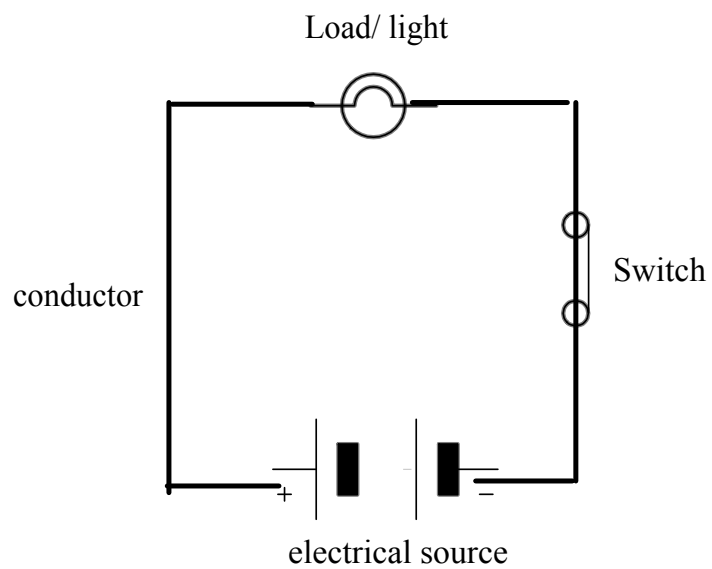
Electric Current - the term used to describe the movement, or flow, of electric charges from one place to another.

Electric Circuit - a controlled path through which electric current passes.

The Parts of an Electric Circuit

A simple circuit has four basic parts:

- 1) Source of Electrical Energy - battery, motor
- 2) Electric Load - toaster, fridge
- 3) Electric Circuit Control Device - switch, timer
- 4) Connector - wire

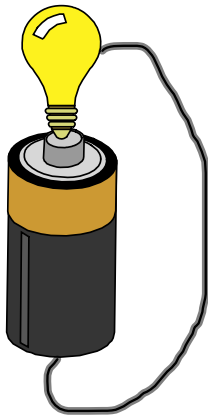


The four basic parts of an electrical circuit

Circuits

Closed Circuit - when a circuit is operating, and current is flowing. The switch is on.

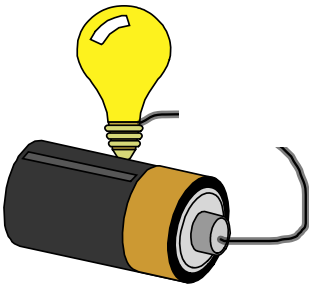
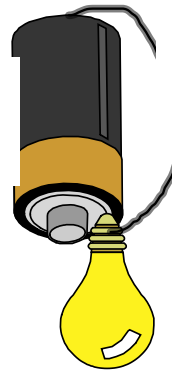
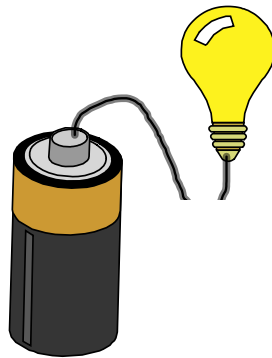
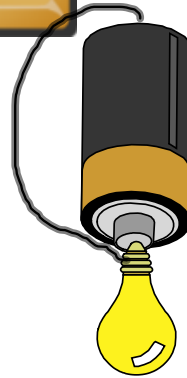
Open Circuit - when a circuit is not operating, and the current is not flowing. The switch is off.



YES

Drag the word YES or NO
to reveal if the light bulb will light.

NO



Schematic Circuit Diagrams

When we draw circuits on paper we use specific predetermined symbols to represent different components.

Schematic circuit diagram - a representation of a circuit using symbols.

Ammeter

Voltmeter

Battery

Conductor

Resistor

Motor





Switch

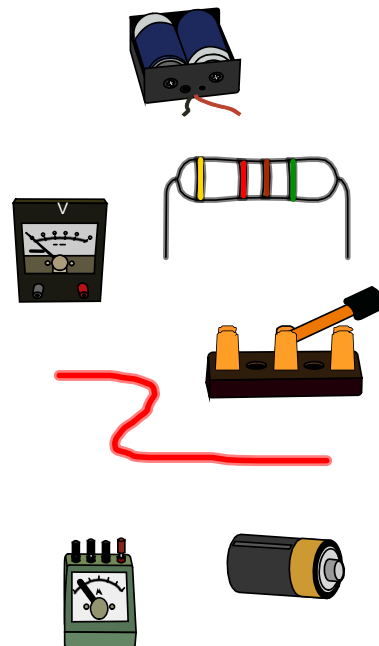
Lamp

SCHEMATIC
SYMBOLS




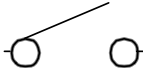


Match the symbol to the correct picture.

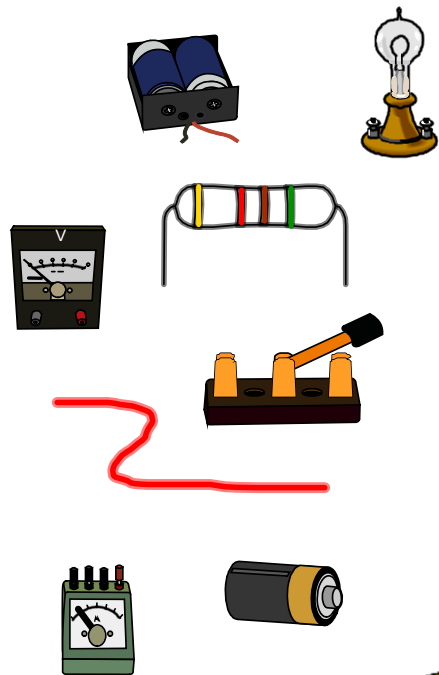
Circuit Symbol	Circuit Component
 voltmeter	
 cell	
 resistor	
 connecting wire	





Match the symbol to the correct picture.

Circuit Symbol	Circuit Component
 ammeter	
 switch	
 bulb	
 battery	



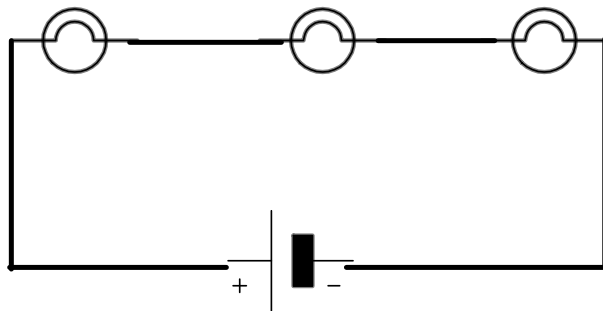
Types of Circuits

There are two basic types of circuits:

- series circuits
- parallel circuits

Series Circuits

An electric circuit in which electric loads are wired to each other in a single path.

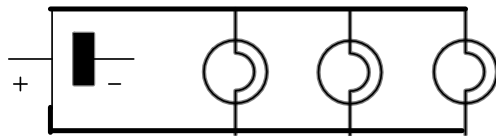


The current passes through each bulb in turn

There is only one pathway

Parallel Circuits



An electric circuit that is branched, contains multiple paths.



Separate current path for each section of the circuit

Each bulb has its own path to the current source



Place an  beside an incorrect statement and a  beside a correct statement.



A parallel circuit has one path along which electrons can move.

☐

A series circuit has more than one path along which electrons can move.

☐

A series circuit has only one path along which electrons can move.

☐

A parallel circuit has more than one path along which electrons can move.

☐

Voltage (V)

Voltage - the amount of electrical energy that an electron possesses. Measured in volts (V)

- Also referred to as Electric potential

Electric Current (I)

Current - the rate at which electric charges move past a given point in a circuit.

- measured in ampere (A)

Electrical Resistance (R)

Resistance - the ability to impede the flow of electrons in conductors.

- measured in ohms (Ω)

Resistors - an electrical device that is designed to slow/stop the flow of electrons.

Ohm's Law

Ohm's Law - the potential difference (voltage) between two points on a conductor is directly related to the electric current flowing through the conductor.

Potential Difference = Current \times Resistance

$$V = I \times R$$

Problem 1

What is the voltage drop across the tungsten filament in a 100 W light bulb? The resistance of the filament is $144\ \Omega$ and a current of 0.833 A is flowing through it.



Problem 2

An electric toaster is connected to a 120 V outlet in the kitchen. If the heating element in the toaster has a resistance of $14\ \Omega$, calculate the current flowing through it.



Problem 3

The current required to operate an electric can opener is 1.5 A. What is its resistance if the supply voltage is 120 V?



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- measured in ampere (A)

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